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BROOKHOUSE PAXFORD LTD

Report on Air Emission Monitoring at

Redwongs Way

Huntingdon

December 2002

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1.0 INTRODUCTION

At the request of Mr Hodson of Brookhouse Paxford Ltd, RPS Health, Safety and Environment Ltd conducted air emission monitoring at the Huntingdon site in December 2002.

The purpose of the monitoring programme was to provide data on emissions to atmosphere for comparison with the limits specified in the air emission criteria for this site.

1.1 Emission Criteria

Information provided by Brookhouse Paxford Ltd personnel regarding the air emission limits for this site has been included in Appendix A, Table 1 for reference purposes. It is understood that the air emission concentration limits are specified in Huntingdonshire District Council Aut*horisation 01/02/A*

All results have been referenced to conditions of 273K, 101.3kPa, without correction for water vapour content.

1.2 Emission Points

During the works undertaken in December 2002 the following release points were included in the monitoring programme:

- Large Spraybake
- Small Spraybake

2.0 MONITORING PROCEDURES

2.1 Emission Parameters

The following emission parameters were monitored during the programme of works: -

- gas flows;
- gas temperatures;
- isocyanates (as total NCO group excluding particulate matter);
- total particulate matter;
- volatile organic compounds (as total carbon excluding particulate matter).

2.2 Monitoring Procedures

The monitoring was carried out using the following United Kingdom Accreditation Service (UKAS) approved procedures unless otherwise stated: -

- **gas flows** were measured using a pitot tube and manometer based on the requirements of BS 3405:1983 *Measurement of particulate emission including grit and dust (simplified method)*. (RPSCE/1/2).

- **gas temperatures** were measured using a "k" type thermocouple and temperature sensor based on the requirements of BS 3405:1983 *Measurement of particulate emission including grit and dust (simplified method)*. (RPSCE/1/2)

- **isocyanates (as NCO group excluding particulate matter)** were determined by passing a known volume of filtered stack gas through impingers containing 1-(2-methoxy phenyl piperazine). The samples were analysed by HPLC. (RPSCE/1/18)

- **total particulate matter** was measured using an Analex BNF sampling train operated in accordance with the requirements of BS. 3405:1983 *Measurement of particulate emission including grit and dust (simplified method)*. The samples were analysed by gravimetric techniques. (RPSCE/1/6)

- **volatile organic compounds (as total carbon excluding particulate matter)** were measured using a Flame Ionisation Detector (FID) based on the requirements of **Method 25a** (US CFR- Protection of the Environment, 40, Part 60 Appendix A *Determination of total gaseous organic concentration using a flame ionisation analyser*). (RPSCE/1/4)

Sampling was undertaken during what was reported by Brookhouse Paxford Ltd personnel to be normal operating conditions.

Exhaust gases were conditioned as required prior to their introduction into direct reading analysers and extractive gas sampling trains.

All analyses were undertaken by RPS Laboratories, Manchester, which is a UKAS accredited laboratory.

4.0 OBSERVATIONS AND CONCLUSIONS

4.1 Large Spraybake

The mean concentration of all parameters measured from the Large Spraybake exhaust in December 2002 were ***below*** their respective emission concentration limits as specified in Huntingdonshire District Council Authorisation 01/02/A, when referenced to 273K, 101.3 kPa without correction for water vapour content.

4.2 Small Spraybake

The mean concentration of all parameters measured from the Small Spraybake exhaust in December 2002 were ***below*** their respective emission concentration limits as specified in Huntingdonshire District Council Authorisation 01/02/A, when referenced to 273K, 101.3 kPa without correction for water vapour content.

Table 1

Summary Table of Emissions to Atmosphere Measured from the Specified Process Exhausts at Brookhouse Paxford Ltd, Huntingdon in December 2002

Emission Parameter	Units	Large Spraybake	Small Spraybake	Concentration Limit ψ
		Result	Result	
Total Particulate Matter	mg/m^3	1.7	Run 1 = 6.0 ¥ Run 2 = 2.6 ¥	50
VOC's (as total carbon excluding particulate matter)	mg/m^3	45	57	150 (where the organic solvent comsumption is between 5 and 15 tonnes per annum)
Isocyanates (as total NCO group excluding particulate matter)	mg/m^3	<0.01	<0.01	0.1

Notes:

Reference conditions expressed as 273 K, 101.3 kPa without correction for water vapour content.

ψ *As expressed in Huntingdon District Council Authorisation 01/02/A.*

¥ *The total particulate matter results for the Small Spraybake Exhaust have been reported separately. This is a requirement of BS 3405 when the ratio of mass emissions is greater than 1.5:1*

Table 2

Results of Total Particulate Matter and General Emission Parameters measured from the Large Spraybake Exhaust at Brookhouse Paxford Ltd, Huntingdon in December 2002

Internal area of duct: 0.52 m^2
Barometric pressure: 102.0 kPa

Emission Parameter	Units	Run 1	Run 2	Mean of Results
Sample Date	-	19.12.02	19.12.02	-
Sample Period	-	12:03 – 12:27	12:33- 12:57	-
Temperature	°C	19	19	**19**
Gas Velocity (as measured at sampling plane)	m/sec	7.3	7.3	**7.3**
Volumetric Flowrate (as measured)	m^3/sec	3.7	3.7	**3.7**
Volumetric Flowrate (at reference conditions)	m^3/sec*	3.5	3.5	**3.5**
Total Particulate Matter Mass Emission	kg/hr	0.024	0.019	**0.022**
Total Particulate Emission Concentration	mg/m^3*	1.9	1.5	**1.7**

Notes:
* *Reference conditions expressed as 273 K, 101.3 kPa without correction for water vapour content.*

The main procedural requirements of BS 3405:1983 *Measurement of particulate emission including grit and dust (simplified method)* were met.

Table 3

Results of Total Particulate Matter and General Emission Parameters measured from the Small Spraybake Exhaust at Brookhouse Paxford Ltd, Huntingdon in December 2002

Internal area of duct: 0.28 m^2
Barometric pressure: 102.0 kPa

Emission Parameter	Units	Run 1	Run 2
Sample Date	-	19.12.02	19.12.02
Sample Period	-	14:42 – 15:02	15:10 – 15:30
Temperature	°C	22	22
Gas Velocity (as measured at sampling plane)	m/sec	10	10
Volumetric Flowrate (as measured)	m^3/sec	2.9	2.9
Volumetric Flowrate (at reference conditions)	m^3/sec*	2.7	2.7
Total Particulate Matter Mass Emission	kg/hr	0.058	0.025
Total Particulate Emission Concentration	mg/m^3*	**6.0**	**2.6**

Notes:

* *Reference conditions expressed as 273 K, 101.3 kPa without correction for water vapour content.*

The main procedural requirements of BS 3405:1983 *Measurement of particulate emission including grit and dust (simplified method)* were met apart from the ratio of mass emissions between samples runs was greater than 1.5:1

Table 4

Results of Isocyanates (as total NCO excluding particulate matter) concentrations measured from the Specified Process Exhausts at Brookhouse Paxford Ltd, Huntingdon, in December 2002

Emission Reference	Sample Number	Date of Sampling	Sample Period	Units	Result	Mean Result
Large Spraybake	1	19.12.02	11:30 – 12:10	mg/m^3	<0.01	**<0.01**
	2	19.12.02	12:17 – 12:57	mg/m^3	<0.01	
Small Spraybake	1	19.12.02	14:42 – 15:02	mg/m^3	<0.01	**<0.01**
	2	19.12.02	15:10 – 15:30	mg/m^3	<0.01	

Notes:

Reference conditions expressed as 273 K, 101.3 kPa without correction for water vapour content.

Table 5

Results of Volatile Organic Compounds (expressed as total carbon excluding particulate matter) concentration measured from the Specified Process Exhausts at Brookhouse Paxford Ltd, Huntingdon in December 2002

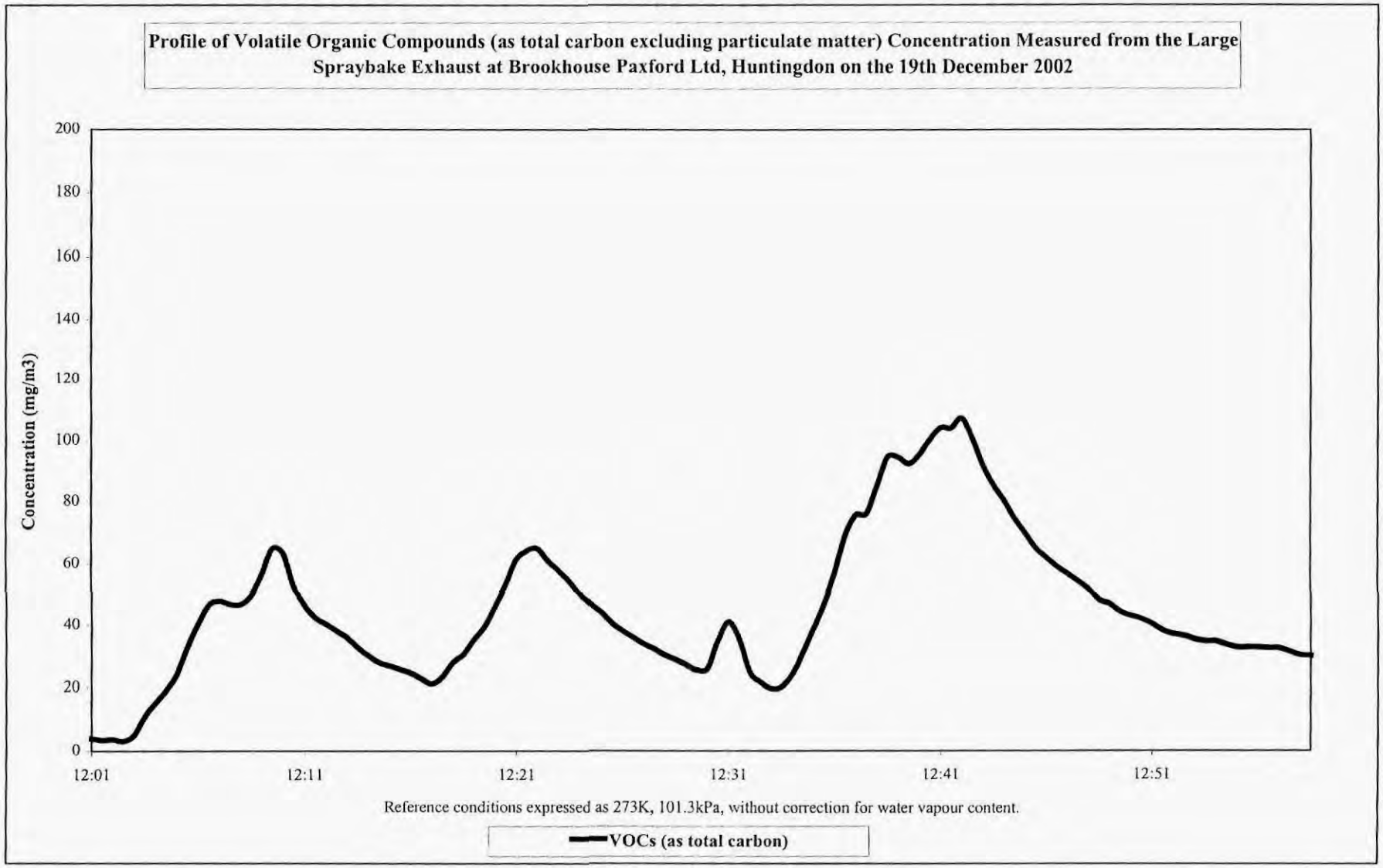
Emission Reference	Date of Sampling	Sample Period	Units	VOC concentration (as total carbon excluding particulate matter)	
Large Spraybake	19.12.02	12:01 – 12:59	mg/m^3	Maximum	107
				Mean	**45**
Small Spraybake	19.12.02	14:36 – 15:30	mg/m^3	Maximum	528
				Mean	**57**

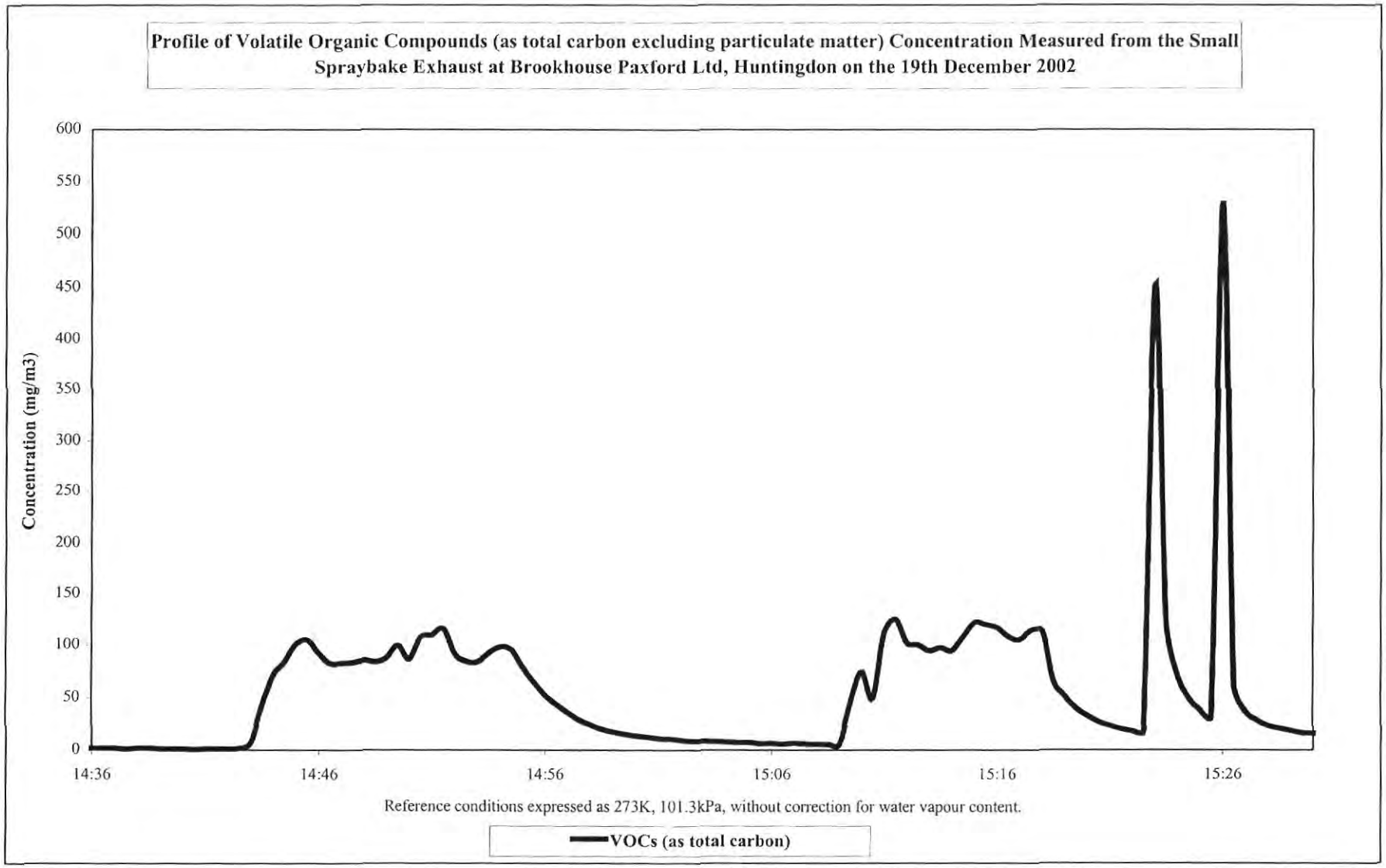
Notes:

Reference conditions expressed as 273 K, 101.3 kPa without correction for water vapour content.

APPENDIX C

Emission Profiles


Profile of Volatile Organic Compounds (as total carbon excluding particulate matter) Concentration Measured from the Large Spraybake Exhaust at Brookhouse Paxford Ltd, Huntingdon on the 19th December 2002
Concentration (mg/m3)
200
180
160
140
120
100
80
60
40
20
0
12:01
12:11
12:21
12:31
12:41
12:51
Reference conditions expressed as 273K, 101.3kPa, without correction for water vapour content.
VOCs (as total carbon)


Profile of Volatile Organic Compounds (as total carbon excluding particulate matter) Concentration Measured from the Small Spraybake Exhaust at Brookhouse Paxford Ltd, Huntingdon on the 19th December 2002
Concentration (mg/m3)
600
550
500
450
400
350
300
250
200
150
100
50
0
14:36
14:46
14:56
15:06
15:16
15:26
Reference conditions expressed as 273K, 101.3kPa, without correction for water vapour content.
VOCs (as total carbon)